

Moles Lab Activity 3: Compounds—Water

Materials

Water
Graduated cylinder
Balance

Procedure

Take the necessary measurements, and record them with units. Show all your calculations, rounding your answers to the teacher-specified number of significant digits and labeling units clearly.

1. Mass 50.0 mL of water, using the graduated cylinder. Be sure to subtract out the mass of the cylinder. Record the mass of the water.
2. Find and record the molar mass of water (H_2O).
3. Answer the following questions:
 - Is 50.0 mL of water less than, equal to, or more than one mole of water?
 - How many moles of water are in 50.0 mL of water?
 - How many molecules of water are in 50.0 mL of water?
 - How many individual atoms of hydrogen are in 50.0 mL of water?
 - What is the density of your water sample?
4. Check your answers with the student water experts, and ask them to initial your original data to certify that they are correct.

Extension

1. Solve the problem:
 - Calculate the percent by mass of each element (H and O) in water (H_2O).
 - Calculate the mass of hydrogen in your 50.0 mL of water.
 - Calculate the mass of oxygen in your 50.0 mL of water.
 - Use the density of water to calculate the volume of one mole of water, in mL.

One swallow of water is about 20 mL of water. How many moles of water are in one swallow? _____ How many molecules of water are in one swallow? _____

Moles Lab Activity 3: Compounds—Sodium Chloride

Materials

Sample of sodium chloride
Sample of calcium chloride
Test tube
Weighing dish
Balance

Procedure

Take the necessary measurements, and record them with units. Show all your calculations, rounding your answers to the teacher-specified number of significant digits and labeling units clearly.

1. Use a weighing dish to determine the mass of the sodium chloride sample in the test tube.
2. Find and record the molar mass of sodium chloride (NaCl).
3. Answer the following questions:
Is the amount in the sample less than, equal to, or more than one mole of sodium chloride?

How many moles of sodium chloride are in the sample?

How many molecules of sodium chloride are in the sample?

How many individual ions (both anions and cations) are in the sample?
4. Check your answers with the student sodium chloride experts, and ask them to initial your original data to certify that they are correct.

Extension

1. Calculate the percent by mass of each element (Na and Cl) in the salt sodium chloride (NaCl).
2. Calculate the percent by mass of each element (Ca and Cl₂) in the salt calcium chloride (CaCl₂).
3. Pure water freezes at 0°C. When substances are dissolved in water, the solute particles affect the intermolecular attractions of the water, decreasing the freezing point and

elevating the boiling point. This is called a “colligative property.” The magnitude of the change is determined by the number (moles) of solute particles dissolved in solution. Which will lower the freezing point of water more—one mole NaCl or one mole of CaCl₂? Why?